	液晶模块说明书	SPEC NO	
	YM12232C-3	REV NO	1.0

## 液晶显示模块 中文说明书

产品类型: 标准产品  
 产品系列号: YM12232C-3  
 产品描述: 122x32 图形点阵  
 控制器: SED1520 , LED 薄背光

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## 一. 基本特征

### 1. 显示特性

- (1) STN 正显 半透模式;
- (2) 显示颜色:绿底**蓝**黑字;
- (3) 显示角度:6 点钟直视;
- (4) 驱动方式:1/32 Duty, 1/6 Bias

### 2. 机械特性

- (1) 外观尺寸:见外观图;
- (2) 点阵:122×32 点;
- (3) 点尺寸:0.36(W)×0.36(H) (MM);
- (4) 点间距:0.40(W)×0.40(H) (MM)

### 3. 引脚特性:

管脚号	管脚名称	LEVER	管脚功能描述
1	VDD	+3~5V	电源电压
2	VSS	0V	电源地
3	VLCD	--	LCD 外接驱动负电压
4	RES	H/L	复位信号(低电平有效)
5	E1	H/L	读写使能信号
6	E2	H/L	读写使能信号)
7	R/W	H/L	读写选择信号
8	A0	H/L	D/I=“H”, 表示 DB7~DB0 为显示数据 D/I=“L”, 表示 DB7~DB0 为显示指令数据
9	DB0	H/L	数据线
10	DB1	H/L	数据线
11	DB2	H/L	数据线
12	DB3	H/L	数据线
13	DB4	H/L	数据线
14	DB5	H/L	数据线
15	DB6	H/L	数据线
16	DB7	H/L	数据线

## 二. 限定参数:

Item	Symbol	Standard Value	Unit	Condition
Power supply voltage	VDD	0~+7.0	V	
LCD driving voltage	VDD~VLCD	0~+12.0		
Input voltage	VIN	VND≤VIN≤VDD		
Operating temperature range	Top	0~+50	℃	No condition
Storage temperature range	Tst	-10~+60		

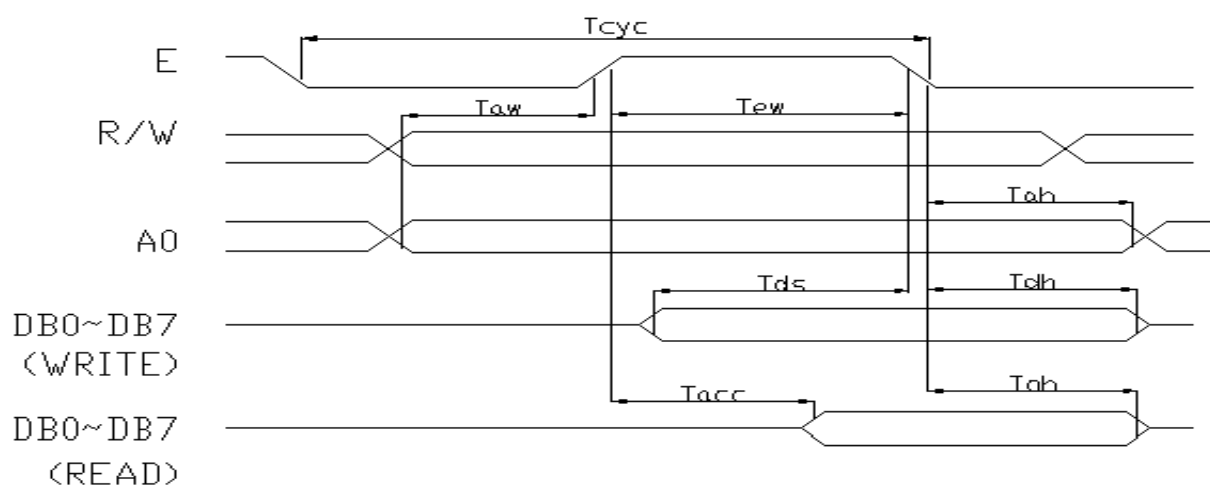
### 三. 直流特性:

( $T_a=0\sim 40^{\circ}\text{C}$ ,  $V_{DD}=2.7\sim 4.5\text{V}$ )

Item	Symbol	Standard Value			Unit
		MIN	TYP	MAX	
Power Supply	VDD	2.4	5.0	6.0	V
LCD Driving Voltage	VLCD	--	0	--	V
Input High Voltage	VIH	0.8VDD		VDD	V
Output High Voltage	VOH	0.5VDD			V
Input Low Voltage	VIL	GND		0.2VDD	V
Output Low Voltage	VOL			0.1VDD	V
Power Supply Current	IDD		--	240	$\mu\text{A}$
I/O Leak Current	IL	-3.0		3.0	$\mu\text{A}$
Stand-by Current	IDDQ		0.05	10.	$\mu\text{A}$

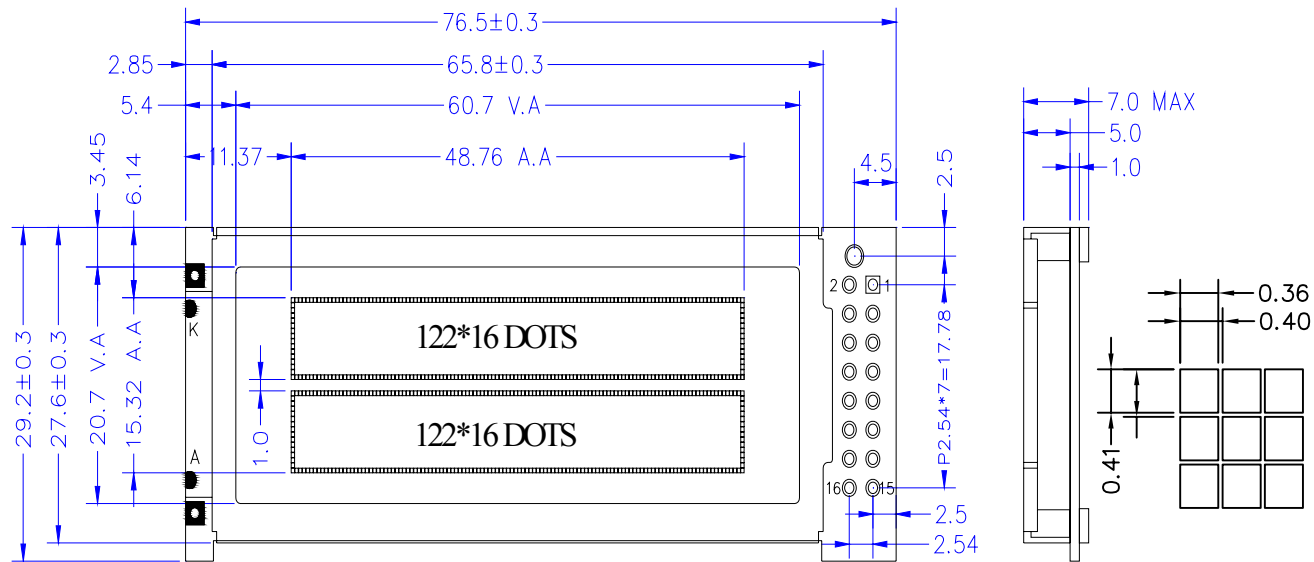
### 四. 交流特性:

Signal	Parameter	Symbol	MIN	MAX	Unit	Condition
A0, /RW	System cycle time	Tcyc	2000	--	ns	CL=100p F
	Address setup time	Taw	40	--	ns	
	Address hold time	Tah	20	--	ns	
D0~D7	Data setup time	Tds	160	--	ns	
	Data hold time	Tdh	20	--	ns	
	Output disable time	Tch	20	120	ns	
	Access time	Tacc	--	180	ns	
E	Enable pulse width(Read)	Tew	200	--		
	Enable pulse width(Write)		160	--	ns	
Input wave width rise time		Tr	--	15	ns	

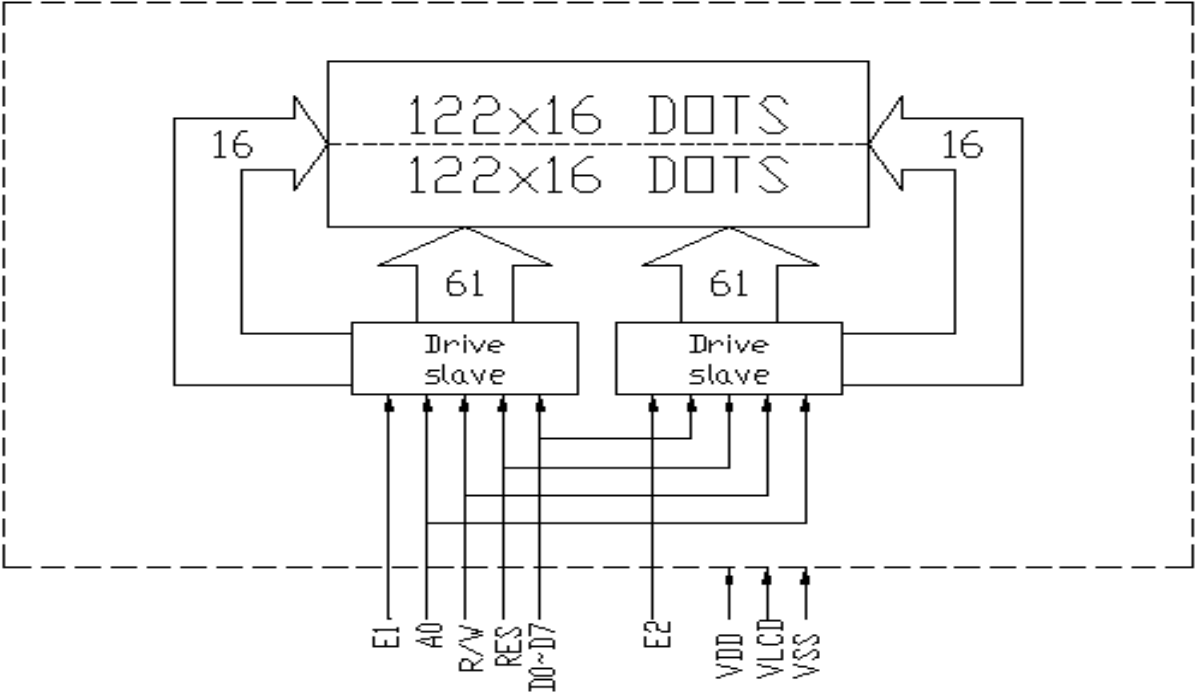


**Bus Read /Write Operaion Sequence**

五. 机械尺寸图:



六. 原理图:



七. DDRAM 地址表

Page	Data		Com No	Drive
2	D0 : D7	: : 122 X 16 PLXELS	0 : : 15	Slave
3	D0 : D7	: : 122 X 16 PLXELS		
0	D0 : D7	: : 122 X 16 PLXELS	16 : : 31	Master
1	D0 : D7	: : 122 X 16 PLXELS		
Column Addr	ADC=0	00H •••• 3C	00H •••• 3C	
	Seg No	0 •••• 60	0 •••• 60	
	Drive	Slave	Master	

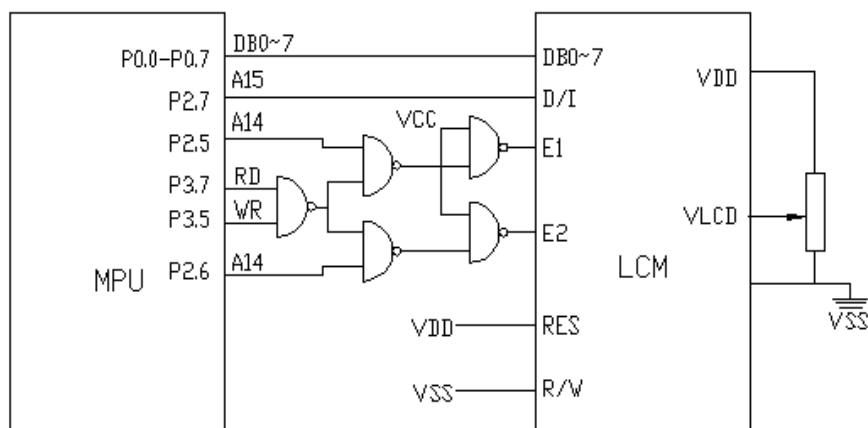
## 八. 指令表:

INSTRCTI ON	CODE										FUNCTION
	R/W	D/I	D7	D6	D5	D4	D3	D2	D1	D0	
DISPLAY  ON/OFF	0	0	1	0	1	0	1	1	1	1/0	Switch the entire display ON or OFF, regardless of the display RAM's Data or the internal status. 1: ON    0: OFF
Display Start Line	0	0	1	1	0	Display start Line (0 •••• 31)				Determines the line of RAM data to be displayed at the display's top line (COM0)	
Page Address set	0	0	1	0	1	1	1	0	PAGE: (0~3)		Sets the page of the Display in the Address register(X address)
Column (seg) Address set	0	0	0	Column address(0~79)							Sets the column of the Display in the column address register(Y address)
Status Read	1	0	B u s y	A D C	ON / OFF	R S T	0	0	0	0	Read status Busy 1:internal operation 0:Ready ADC 1:Rightward output 0:Leftward RST 1:Reseting 0:Normal ON/OFF 1:Display off 0:Display on

Write Display Data	0	1	Write data								Writes the data on the Data bus to RAM
Read Display Data	1	1	Read data								Reads data from the Display RAM onto the Data BUS
ADC Select	0	0	1	0	1	0	0	0	0	0/1	Determine the clockwise or Counterclockwise reading of the display Data RAM 0: Clockwise 1: Counterclockwise
Static Drive ON/OFF	0	0	1	0	1	0	0	1	0	0/1	Select the dynamic or static Driving. 1:Static driving 0: Dynamic driving
Duty Ratio Select	0	0	1	0	1	0	1	0	0	0/1	Select the duty ratio 1:1/32 duty 0:1/16 duty
Read Modify Write	0	0	1	1	1	0	0	0	0	0	Increment the column Address register when writing. But no-change when reading.
End	0	0	1	1	1	0	1	1	1	0	Release from the Read Modify Write Mode.
Reset	0	0	1	1	1	0	0	0	1	0	Set the Display Start Line Register to 1 <sup>st</sup> line, column Address count to 0 and Page Add. Resister to 0.
Power Save(dual command)	0 0	0 0	0 0	1 1	0 0	1 1	0 0	1 1	1 0	0 1	Set the power save mode by selecting display off and static driving on

## 九. 应用举例

YM12232C-3与单片机 8031 的一种接口如图 5 所示：（VDD=+5V）



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## 利用图 5 举例介绍编程实例

```
        ORG 0100H
INITM: MOV A, #0E2H          ; RESET
        LCALL OUTMI
        LCALL OUTSI
        MOV A, #0AEH        ; OFF DISPLAY
        LCALL OUTMI
        LCALL OUTSI
        MOV A, #0A4H        ; OFF STATIC DRIVE
        LCALL OUTMI
        LCALL OUTSI
        MOV A, #0A9H        ; SELECT 1/32 DUTY
        LCALL OUTMI
        LCALL OUTSI
        MOV A, #0A0H        ; ADC SELECT RIGHTWARS OUTPUT
        LCALL OUTMI
        LCALL OUTSI
        MOV A, #0EEH        ; READ MODIFY WRITE OFF
        LCALL OUTMI
        LCALL OUTSI
        MOV A, #00H        ; COLUMN ADDRESS SET
        LCALL OUTMI
        LCALL OUTSI
        MOV A, #0C0H        ; SET DISPLAY START LINE
        LCALL OUTMI
        LCALL OUTSI
        MOV A, #0AFH        ; ON DISPLAY
        LCALL OUTMI
        LCALL OUTSI
; DISPLAY "*"
        MOV R2, #0B8H
DIS2: MOV A, R2
        LCALL OUTMI
        LCALL OUTSI
        MOV A, #00H
        LCALL OUTMI
        LCALL OUTSI
        MOV R1, #1FH
DIS1: MOV A, #55H
        LCALL OUTMI
        LCALL OUTSI
        MOV A, #0AAH
        LCALL OUTMI
```



---

```
LCALL  OUTSI
DJNZ  R1, DIS1
INC  R2
CJNE  R2, #0BCH, DIS2
LCALL  MS40
LCALL  MS40
LCALL  MS40
LCALL  MS40
MOV  A, #0AFH
```

; DISPLAY “横条”

```
MOV  R2, #0B8H
DIS3: MOV  A, R2
LCALL  OUTMI
LCALL  OUTSI
MOV  A, #00H
LCALL  OUTMI
LCALL  OUTSI
MOV  R1, #3DH
DIS4: MOV  A, #55H
LCALL  OUTMD
LCALL  OUTSD
DJNZ  R1 , DIS4
INC  R2
CJIE  R2, #0BCH, DIS3
LCALL  MS40
LCALL  MS40
LCALL  MS40
LCALL  MS40
MOV  A, #0AFH
LCALL  OUTMI
LCALL  OUTSI
```

; DISPLAY “竖条”

```
MOV  R2, #0B8H
DIS5: MOV  A, R2
LCALL  OUTMI
LCALL  OUTSI
MOV  A, #00H
LCALL  OUTMI
LCALL  OUTSI
MOV  R1, #1EH
DIS6: MOV  A, #00H
LCALL  OUTMI
```

---

```

LCALL  OUTSI
MOV  A, #0FFH
LCALL  OUTMI
LCALL  OUTSI
DJNZ  R1, DIS6
MOV  A, #3CH
LCALL  OUTMI
LCALL  OUTSI
MOV  A, #00H
LCALL  OUTMI
LCALL  OUTSI
INC  R2
CJNE  R2, #0BCH, DIS5
LCALL  MS40
LCALL  MS40
LCALL  MS40
LCALL  MS40
MOV  A, #0AFH

```

; DISPLAY 汉字 “两只黄鹂鸣翠柳 一行白鹭上青天”

```

INITMC: MOV  DPTR, #CHINESE
        MOV  R1  #00H
        MOV  B, #B8H
DISPWORDM: PUSH  B
        MOV  A, B
        LCALL OUTMI
        LCALL OUTST
        MOV  A, #00H
        LCALL OUTMI
        MOV  R2 #7AH
DISPWORD1: MOV  A, R1
        MOVC A, @A+DPTR
        LCALL OUTMD
        INC  DPTR
        DEC  R2
        CJNE R2, #3DH, DISPWORD1
        MOV  A, #00H
        LCALL OUTST
DISPWORD2: MOV  A, R1
        MOVC A, @A+DPTR
        LCALL OUTSD
        INC  DPTR
        DJNZ  R2, DISPWORD2

```

---

```
MOV R1, #00H
POP B
INC B
MOV A, B
CINZ A, #0BCH, DISPWORDM
LCALL MS40
LCALL MS40
LCALL MS40
LCALL MS40
```

```
AJMP INITM
```

```
MS40: MOV R7, #0E8H
MS2:  MOV R6, #0FFH
MS1:  DJNA R6, MS1
      DJNZ R7, MS2
      RET
```

```
; OUT INSTRUCTION TO MASTER 6450
```

```
OUTMI: PUSH DPH
      PUSH DPL
      MOV DPTR, #6000H
      MOVX @DPTR, A
      POP DPL
      POP DPH
      RET
```

```
; OUT INSTRUCTION TO SLAVE 6450
```

```
OUTSI: PUSH DPH
      PUSH DPL
      MOV DPTR, #5000H
      MOVX @DPTR, A
      POP DPL
      POP DPH
      RET
```

```
; OUT DATA TO MASTER 6450
```

```
OUTMD: PUSH DPH
      PUSH DPL
      MOV DPTR, #0E000H
      MOVX @DPTR, A
      POP DPL
      POP DPH
      RET
```

---

```
; OUT DATA TO SLAVE 6450
OUTSD: PUSH DPH
      PUSH DPL
      MOV DPTR, #0D000H
      MOVX @DPTR, A
      POP DPL
      POP DPH
      RET
```

CHINESE:; (PAGE0)

```
DB 00H, 00H
DB 00H, 80H, 80H, 80H, 80H, 80H, 80H, 80H, 80H, 80H, 80H, 80H, 80H, 80H, 0C0H, 80H, 00
DB 00, 00, 10H, 88H, 0C4H, 23H, 40H, 42H, 42H, 42H, 42H, 42H, 0C2H, 43H, 62H, 40H, 00
DB 00, 00, 00, 0F8H, 08H, 0CH, 0AH, 09H, 08H, 08H, 08H, 08H, 08H, 0FCH, 08H, 00, 00
DB 00, 80H, 0EEH, 8AH, 0FAH, 0AAH, 0AEH, 80H, 24H, 0E3H, 0B6H, 0AAH, 0B6H, 0E2H, 20H, 20H, 00
DB 00, 00, 00, 00, 00, 00, 00, 00, 00, 0FFH, 20H, 20H, 20H, 30H, 20H, 00, 00, 00
DB 00, 40H, 44H, 54H, 54H, 54H, 54H, 54H, 7FH, 54H, 54H, 54H, 54H, 56H, 44H, 40H, 00
DB 00, 40H, 42H, 42H, 42H, 42H, 42H, 42H, 0FEH, 42H, 42H, 42H, 42H, 43H, 62H, 40H, 00
DB 00
```

; (PAGE1)

```
DB 00, 00
DB 00, 00, 00, 00, 00, 00, 00, 00, 00, 00, 00, 00, 00, 00, 00, 00, 00
DB 00, 02H, 01H, 00, 0FFH, 00, 00, 00, 00, 00, 40H, 80H, 7FH, 00, 00, 00, 00
DB 00, 00, 00, 7FH, 21H, 21H, 21H, 21H, 21H, 21H, 21H, 21H, 21H, 7FH, 00, 00, 00
DB 00, 00, 40H, 40H, 5H, 52H, 53H, 56H, 5AH, 52H, 5AH, 56H, 90H, 90H, 78H, 10H, 00
DB 00, 40H, 40H, 40H, 40H, 40H, 40H, 40H, 7FH, 40H, 40H, 40H, 40H, 40H, 60H, 40H, 00
DB 00, 00, 00, 00, 0FFH, 15H, 15H, 15H, 15H, 15H, 55H, 95H, 7FH, 00, 00, 00, 00
DB 00, 80H, 80H, 40H, 20H, 10H, 0CH, 03H, 00, 03H, 0CH, 10H, 20H, 40H, 0C0H, 40H, 00
DB 00
```

; (PAGE2)

```
DB 00, 00
DB 00, 02H, 02H, 0F2H, 12H, 12H, 0FEH, 12H, 12H, 12H, 0FEH, 12H, 12H, 0F2H, 03H, 02H, 00
DB 00, 00, 00, 00, 0FCH, 04H, 04H, 04H, 04H, 04H, 04H, 04H, 0FEH, 04H, 00, 00, 00
DB 00, 20H, 20H, 24H, 24H, 24H, 3FH, 24H, 0E4H, 24H, 3FH, 24H, 24H, 24H, 30H, 20H, 00
DB 00, 04H, 0E4H, 24H, 0E4H, 04H, 0E4H, 26H, 0E4H, 00, 0FCH, 06H, 55H, 84H, 7CH, 00, 00
DB 00, 00, 0FCH, 04H, 04H, 0FCH, 04H, 00, 0FCH, 06H, 15H, 44H, 84H, 7EH, 04H, 00, 00
DB 00, 00, 40H, 41H, 55H, 0C9H, 41H, 5FH, 60H, 41H, 55H, 0C9H, 41H, 5FH, 40H, 00, 00
DB 00, 10H, 0D0H, 0FFH, 90H, 10H, 0FEH, 02H, 02H, 0F9H, 00, 0FEH, 02H, 02H, 0FFH, 02H, 00
DB 00
```

; (PAGE3)

```
DB 00, 00
DB 00, 00, 00, 0FFH, 08H, 04H, 03H, 14H, 08H, 04H, 03H, 44H, 98H, 7FH, 00, 00, 00
DB 00, 00, 80H, 40H, 23H, 11H, 19H, 01H, 01H, 01H, 09H, 11H, 23H, 60H, 0C0H, 00, 00
```

---

DB 00, 00, 80H, 80H, 5FH, 55H, 35H, 15H, 1FH, 15H, 35H, 35H, 5FH, 40H, 80H, 00, 00  
DB 00, 00, 7FH, 02H, 7FH, 00, 7FH, 02H, 7FH, 10H, 13H, 12H, 1AH, 52H, 82H, 7EH, 00  
DB 00, 00, 0FH, 04H, 04H, 0FH, 10H, 10H, 13H, 12H, 12H, 1AH, 52H, 82, 7FH, 02H, 00  
DB 00, 08H, 08H, 0AH, 09H, 08H, 09H, 0AH, 0FCH, 0AH, 09H, 08H, 09H, 0AH, 08H, 08H, 00  
DB 00, 01H, 00, 0FFH, 00, 01H, 8FH, 44H, 22H, 1FH, 00, 0FFH, 08H, 10H, 0FH, 00, 00  
DB 00